CLAIMS

What is claimed is:

1. A method for designing a base for mounting a child part to a parent part, comprising:

selecting a location of a first center of expansion of the child part (CE_{child}) relative to the parent part;

determining a location of a second center of expansion of a bond joint (CE_{bond}) that bonds the child part to the base; and

determining a location of a third center of expansion of the base (CE_{base}) so the first center of expansion (CE_{child}) does not substantially move relative to the parent part under a temperature change, wherein the third center of expansion (CE_{base}) is located on a centerline defined by the first center of expansion (CE_{child}) and the second center of expansion (CE_{bond}).

2. The method of claim 1, wherein said determining a location of a third center of expansion of the base (CE_{base}) comprises:

determining a length change of the child part along the centerline from the second center of expansion (CE_{bond}) to the first center of expansion (CE_{child}) under the temperature change;

determining a length of the base that produces the same length change under the temperature change; and

locating the third center of expansion along the centerline at the length away from the second center of expansion (CE_{bond}).

3. The method of claim 2, wherein the child part comprises a plurality of child components, said determining a length change to the child part comprises:

determining length changes to the plurality of child components along the centerline from the second center of expansion (CE_{bond}) to the first center of expansion (CE_{child}) under the temperature change;

summing the length changes to the plurality of components as the length

change of the child part.

4. The method of claim 1, wherein:

the child part comprises an interferometer including a beam splitter and a wave plate;

the first center of expansion (CE_{child}) is located at an outer face of the wave plate;

the second center of expansion (CE_{bond}) is located at the center of the bond joint; and

said determining a location of a third center of expansion of the base (CE_{base}) comprises:

determining a length of the base that produces a same length change as the beam splitter and the wave plate along the centerline from the second center of expansion (CE_{bond}) to the first center of expansion (CE_{child}) under a same temperature change; and

locating the third center of expansion (CE_{base}) along the centerline at the length away from the second center of expansion (CE_{bond}).

5. The method of claim 4, wherein said determining a length of the base comprises:

$$l_{base} = \frac{CTE_{PBS}}{CTE_{base}} \cdot l_{PBS} + \frac{CTE_{QWP}}{CTE_{base}} \cdot l_{QWP},$$

where l_{base} is the length of the base, CTE_{PBS} is a coefficient of thermal expansion of the interferometer, CTE_{base} is a coefficient of thermal expansion of the base, l_{PBS} is a length of the interferometer from the second center of expansion to the quarter-wave plate, CTE_{QWP} is a coefficient of thermal expansion of the quarter-wave plate, and l_{QWP} is a length of the wave plate.

6. The method of claim 1, further comprising:

placing a datum feature along a direction that runs through the third center of expansion (CE_{base}).

7. The method of claim 1, further comprising:

setting the location of the third center of expansion (CE_{base}) by placing at least three flexures so their lines of action intersect at the location of the third center of expansion of the base (CE_{base}).

8. The method of claim 7, further comprising:

performing a spring force balance analysis to determine a movement of the third center of expansion (CE_{base}) relative to the parent part due to the temperature change.

9. The method of claim 8, wherein said performing a spring force balance analysis comprises:

determining a first plurality of forces caused by a thermal expansion or contraction of the base under the temperature change;

determining a second plurality of forces caused by a movement of the base under the temperature change;

summing up the first and the second pluralities of forces to zero; and

determining the movement of the third center of expansion (CE_{base}) from the summing.

10. The method of claim 8, further comprising:

changing a parameter of the design if the movement of the third center of expansion (CE_{base}) is greater than a threshold.

11. The method of claim 8, wherein said changing a parameter of the design comprises changing at least one of an aspect ratio of at least one of the flexures, a length of at least one of the flexures, and the location of the third center of expansion (CE_{base}).

12. The method of claim 7, further comprising:

performing a numerical analysis to determine a movement of the first center of expansion (CE_{child}) due to the temperature change.

13. The method of claim 12, wherein the numerical analysis comprises a finite element analysis.

14. The method of claim 12, further comprising:

changing a parameter of the design if the movement of the first center of expansion (CE_{child}) is greater than a threshold.

15. The method of claim 12, wherein said changing a parameter of the design comprises changing at least one of an aspect ratio of at least one of the flexures, a length of at least one of the flexures, and the location of the third center of expansion (CE_{base}).

16. A structure, comprising:

a base comprising at least three mounting interfaces for mounting the base to a parent part;

a child part mounted atop the base by a bond joint;

wherein:

a first center of expansion of the child part (CE_{child}) and a second center of expansion of the bond joint (CE_{bond}) define a centerline;

the at least three mounting interfaces have lines of action that define a third center of expansion of the base (CE_{base}) on the centerline and located at a length away from the second center of expansion (CE_{bond}) so the first center of expansion (CE_{child}) does not substantially move relative to the parent part under a temperature change.

17. The structure of claim 16, wherein at least one of the mounting interfaces is selected from a group consisting of one flexure plate, two parallel flexure plates, and a ball in groove interface.

18. The structure of claim 17, wherein the base defines at least one mounting hole between the two parallel flexure plates, the mounting hole receiving a fastener for securing the base to the parent part.

19. The structure of claim 16, wherein the base further comprising a datum feature, the

data feature comprises a plane along a direction that runs through the third center of expansion (CE_{base}).

20. The structure of claim 16, wherein the child part comprises an interferometer and a wave plate mounted to a face of the interferometer, and the first center of expansion (CE_{child}) is located at an outer face of the wave plate.